

What is claimed is:

1. A vehicle suspension system placed between a chassis and/or body having a sprung weight and a plurality of wheel axle supports each carrying a portion of an unsprung weight, the suspension system comprising:  
a resilient load bolster mounted between the chassis and/or body and the wheel axle support to carry when preloaded the chassis and/or body at a preset ride height relative to the wheel axle support, and a resilient member affixed between each wheel axle support and the chassis and/or body for exerting increasing force there between as a function of the amount of motion of the unsprung weight relative to the chassis and/or body, the resilient member mounted to move between the chassis and/or body and the wheel axle support applying increasingly less force to the resilient load bolster during jounce while under loading beyond the preloaded at the chassis and/or body preset ride height of the resilient load bolster and the resilient member applying increasingly more force resisting the motion of unsprung weight on the wheel axle support.
2. The suspension system of claim 1 wherein the resilient member has a free length of travel that operates in cooperation with the resilient load bolster jounce deflection so the free length of travel and the jounce deflection overlap when the resilient member moves between the chassis and/or body and the wheel axle support.
3. The suspension system of claim 1 wherein therein the chassis and/or body has a substantially rectangular footprint having four wheels disposed generally to carry the corners thereof with each corner having its wheel axle support moveably carried by its resilient load bolster and its resilient member to resist jounce and, respectively.
4. The suspension system of claim 3 wherein therein a shock absorber is located between and affixed to the chassis and/or body for each wheel axle

support for damping the jounce and rebound motions there between progressively decreasing the frequency of the wheel axle support motion.

5. The suspension system of claim 1 wherein the resilient member is a coil spring having its free length of travel preloaded with tension sufficient to maintain its connection between the chassis and/or body and the wheel axle support even when the resilient load bolster is compressed to its maximum load capacity.

6. The suspension system of claim 1 wherein the resilient member is an elastic member having its free length of travel stretched sufficiently between the chassis and/or body and the wheel axle support to attach thereto even when the resilient load bolster is compressed to its maximum load capacity.

7. The suspension system of claim 1 wherein the resilient member is a torsion spring with torque preloaded sufficiently between the chassis and/or body and the wheel axle support to maintain connection there between even when the resilient load bolster is compressed to its maximum load capacity.

8. The suspension system of claim 1 wherein the resilient load bolster has an elastic constant of  $K$  to carry sprung weight on the wheel axle support and the resilient member has an elastic constant  $K_r$  for resisting the rebound motion of the sprung weight over the wheel axle support.

9. The suspension system of claim 8 wherein the relationship of the elastic constant of  $K$  to carry sprung weight for jounce and the elastic constant  $K_r$  for resisting the rebound motion of the sprung weight is a function of the amount of roll resistance.

10. A vehicle suspension system placed between a chassis and/or body having a sprung weight and a plurality of wheel axle supports each carrying a portion of an unsprung weight, the suspension system comprising:

a coil load spring mounted between the chassis and/or body and each wheel axle support to carry when preloaded the chassis and/or body at a preset ride height relative to the wheel axle support, and

a coil tension spring affixed between each wheel axle support and the chassis and/or body for exerting increasing force thereat as a function of the amount of rebound motion of the sprung weight relative of the chassis and/or body, the coil tension spring mounted relative to the coil load spring for stretching between the chassis and/or body and the wheel axle support to apply increasingly less rebound force to the coil load spring during jounce through and beyond the preset ride height of the coil load spring as each coil tension spring resists the rebound motion of sprung weight at the wheel axle support.

11. The suspension system of claim 10 wherein each coil load spring is coaxial with a load spring axis disposed approximately normal to the chassis and/or body and each wheel axle support, each coil load spring having a concentric volume defined thereby and located there within and the coil tension spring disposed within the concentric volume for movement therein without binding with the coil load spring during jounce and rebound.
12. The suspension system of claim 11 wherein each coil load spring is coaxial with a load spring axis disposed approximately normal to the chassis and/or body and each wheel axle support, and each coil tension spring is spaced apart from the coil load spring along a tension spring axis generally parallel to the load spring axis of each coil load spring as each coil tension spring moves relative to its respective coil load spring during jounce and rebound.
13. A vehicle suspension system placed between a chassis and/or body having a sprung weight and a plurality of wheel axle supports each carrying a portion of an unsprung weight along a line for each wheel axle support, the suspension system comprising:  
a plurality of coil load springs wherein each mounts along its respective line between the chassis and/or body and each respective wheel axle support to carry when preloaded the chassis and/or body thereat with a preset ride height relative to each wheel axle support, each coil load

spring operating in compression under load and jounce along its respective line, and

a plurality of coil control springs affixed between each wheel axle support and the chassis and/or body for exerting increasing force thereat as a function of the amount of rebound motion of the sprung weight relative of the chassis and/or body, each coil control spring mounted relative to its respective coil load spring for compression between the chassis and/or body and the wheel axle support to apply increasingly less rebound force to its respective coil load spring during jounce through and beyond the preset ride height of the coil load spring as each respective coil control spring resists the rebound motion of sprung weight over its respective wheel axle support, and

a path defined by each line between the chassis and/or body and the wheel axle support along which each coil load spring and its respective coil control spring jounce and rebound and wherein the coil control spring has a free length of travel along the path that operates in cooperation with the coil load spring jounce deflection along the path so the free length of travel along the path and the jounce deflection along the path overlap as the coil load spring moves between the chassis and/or body and the wheel axle support.

14. The suspension system of claim 13 wherein each wheel axle support includes a rod fixed to the chassis and/or body extending along the line for supporting a suspension platform disposed in compression for reciprocation along the path with and between the coil load spring and the coil control spring during jounce and rebound and the suspension platform affixed to the wheel axle support.
15. A method of using a vehicle suspension system placed between a chassis and/or body having a sprung weight and a plurality of wheel axle supports each carrying a portion of an unsprung weight, the method having steps comprising:

mounting a resilient load bolster between the chassis and/or body and the wheel axle support for carrying when preloaded the chassis and/or body at a preset ride height relative to the wheel axle support;

affixing a resilient member between each wheel axle support and the chassis and/or body for exerting increasing force there between as a function of the amount of motion of the unsprung weight relative to the chassis and/or body, and

mounting the resilient member for movement between the chassis and/or body and the wheel axle support while applying increasingly less force to the resilient load bolster during jounce while under loading beyond the preloaded at the chassis and/or body preset ride height of the resilient load bolster and the resilient member applying increasingly more force resisting the motion of unsprung weight on the wheel axle support.

16. The method of claim 15 with the step of having the resilient member with a free length of travel that operates in cooperation with the resilient load bolster jounce deflection so the free length of travel and the jounce deflection overlap when the resilient member moves between the chassis and/or body and the wheel axle support.
17. The method of claim 15 with the step of having the chassis and/or body with a substantially rectangular footprint having four wheels disposed generally to carry the corners thereof with each corner having its wheel axle support moveably carried by its resilient load bolster and its resilient member to resist jounce and, respectively.
18. The method of claim 17 with the step of having a shock absorber is located between and affixed to the chassis and/or body for each wheel axle support for damping the jounce and rebound motions there between progressively decreasing the frequency of the wheel axle support motion.
19. The method of claim 15 with the step of having the resilient member as a coil spring having its free length of travel preloaded with tension sufficient to maintain its connection between the chassis and/or body and the wheel axle

support even when the resilient load bolster is compressed to its maximum load capacity.

20. The method of claim 15 with the step of having the resilient member as an elastic member having its free length of travel stretched sufficiently between the chassis and/or body and the wheel axle support to attach thereto even when the resilient load bolster is compressed to its maximum load capacity.